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Use of Optisim Software to Observe Effect of Different Sources in Optical Fiber

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ABSTRACT

Attenuation in fiber optics also known as transmission loss is the reduction in intensity of light beam width request respect to distance travelled through a transmission medium. Attenuation coefficient in fiber optics usually use units of db/km. The medium is typically fiber of silica glass that confines the incident light beam to the inside Attenuation in optical fiber is caused primarily by both scattering and absorption.

KEYWORDS: *Optisim software, optical fiber, line codes*

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1. INTRODUCTION

The output of semiconductor LASER exhibits fluctuation in its intensity, phase, frequency even when the LASER is biased at constant current with negligible current fluctuation. The two fundamental noise mechanisms are spontaneous and electron hole recombination. The occurance rate of such a spontaneously emitted random field is about 1012 because of which intensity and phase of emitted light exihibit fluctuation over time scale as short as loops.

Intensity fluctuation lead to limited signal to noise ratio (SNR) whereas phase fluctuation leads to finite spectral width when semiconductor LASER are operated at constant current. Clearly such fluctuation lead to degradation of such system performance, so it is important to estimate their magnitude. Amplitude fluctuation are characterized by a factor called as relative Intensity to noise ratio.

Self-phase modulation is an important effect of light matter interaction. An ultrashort pulse of light when travelling in the medium will induce varying refractive index of medium due to kerr effect. This variation in refractive index will produce leading to change of pulse frequency spectrum. Self-phase modulation is an important effect in optical system that in short pulse of light such as LASER in optical fiber communication.

NRZ and RZ Signal format:-

NRZ (Non return to zero) code is the simplest method for encoding data. Unipolar NRZ means that a logic1 is represented by voltage or light pulse that fills an entire bit per code, whereas for logic0 Or no pulse is transmitted.

The NRZ code needs the minimum bandwidth and it is simple to generate and decode however the lack of being capalities is an NRZ code can lead to true mini interpolation of bit stream at the receiver.

RZ (Return to zero) code method shows the tuning problem associated with NRZ encoding method. RZ method is used when inadequate bandwidth margin exists.

RZ code has amplitude transition at the beginning of each bit interval when binary 1 is beginning and each bit interval when binary 0.

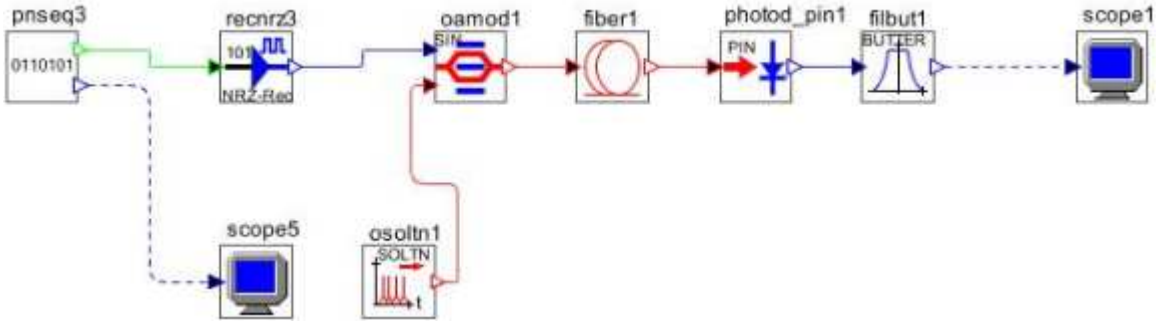
Thus for RZ pulse , 1 bit occupies only part of the bit interval and returns to zero in the remainder of bit interval no pulse is used for '0' bit. Although RZ

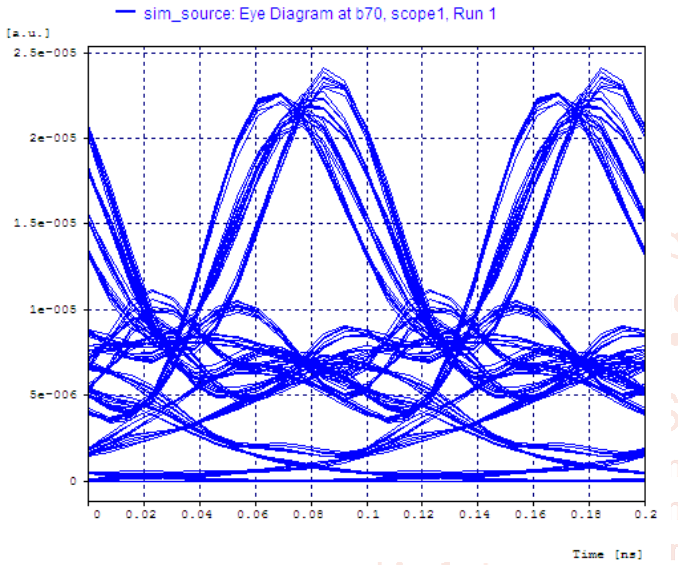
pulse remain occupies exactly half a bit and send data at rate of 10Gb/sec and higher.

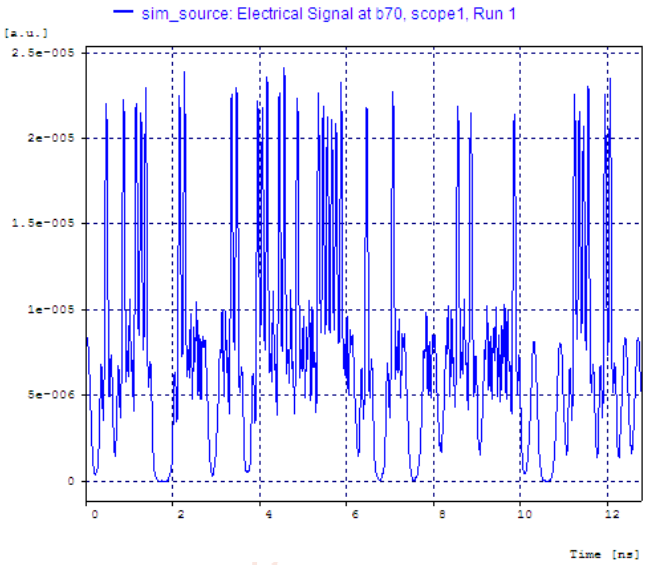
2. SIMULATION AND RESULTS

2.1. Effect of source

Effect of (Using Soliton Optical Pulse Generator optical source)





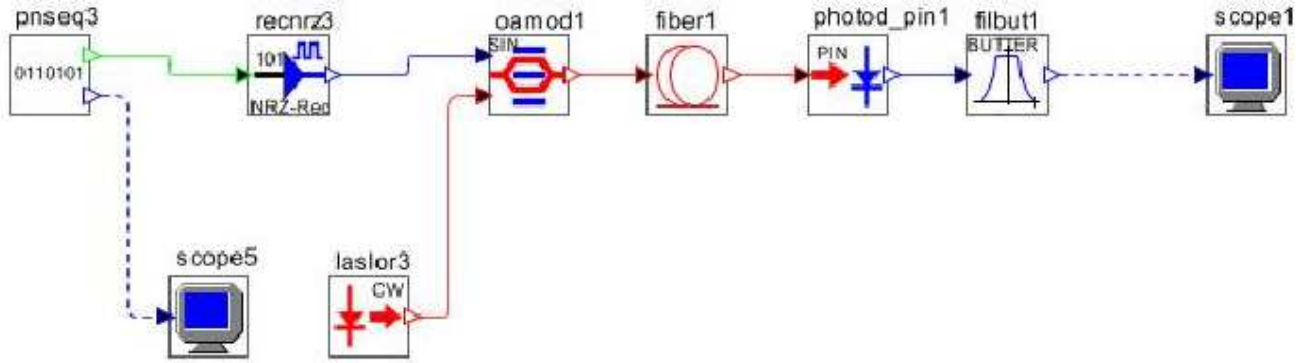


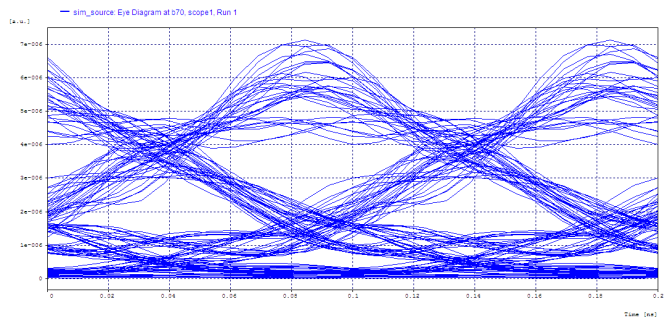
Lenth=100 Km

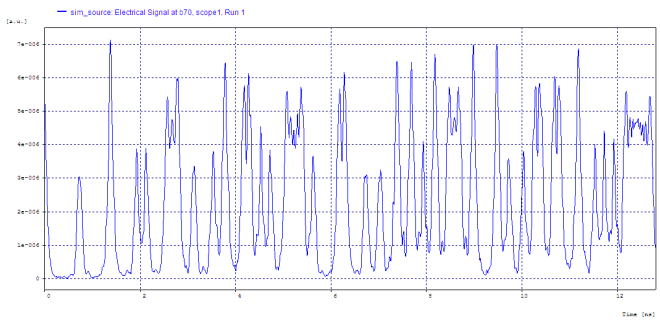
Q factor	6.0206
BER	0.0227501
Eye Closure	10.172178
Jitter	0.020811

2.2. Effect of source

(Using CW Lorentzian Laser optical source)



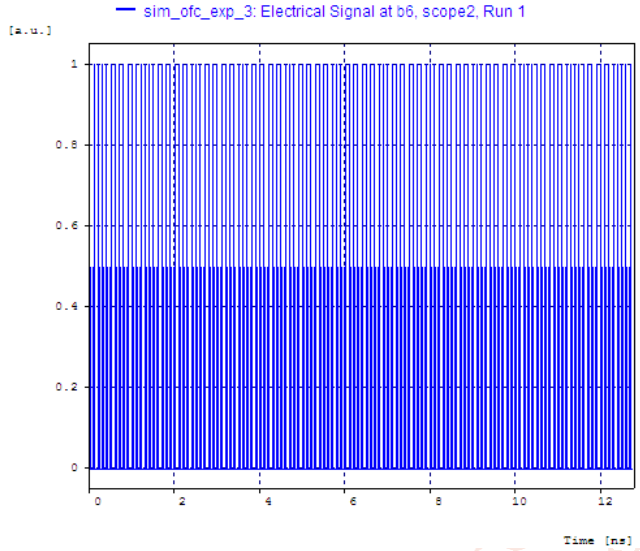


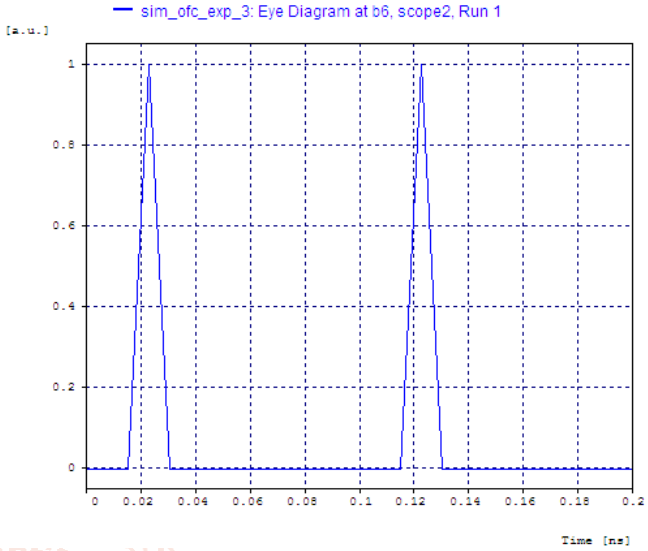


Lenth=100 Km

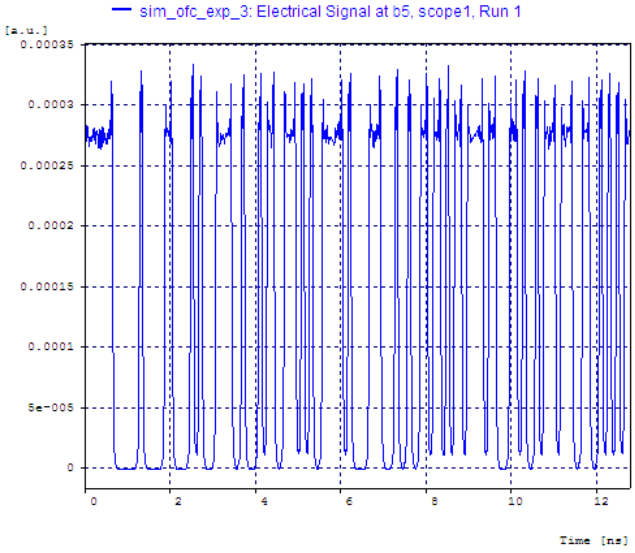
Q factor (dB)	12.128744
BER	3.82873e-005
Eye Closure (dB)	13.257768
Jitter (ns)	0.255276

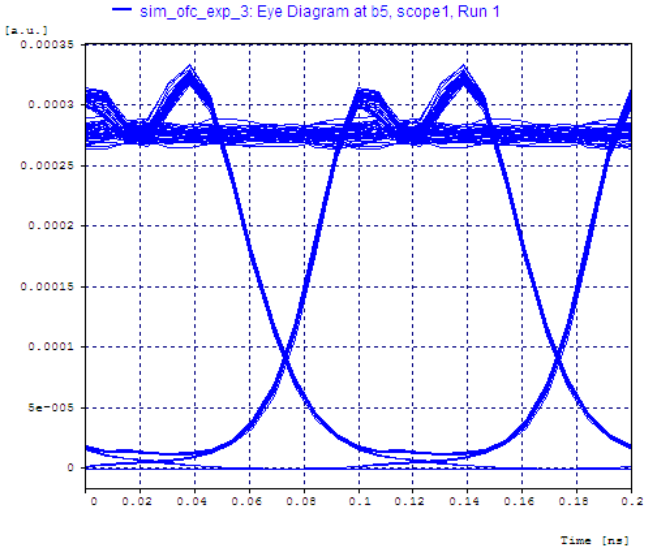
Pulse generator input





Output of photo diode





3. CONCLUSION:

From observation and block diagram set up we have analyzed that the effect of different sources in optical fiber using OPTISIM software.

4. REFERENCES:

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